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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/670,564	09/26/2003	Edward Ashton	116741-00215	8133

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BLANK ROME LLP
600 NEW HAMPSHIRE AVENUE, N.W.
WASHINGTON, DC 20037

EXAMINER

PATEL, SHEFALI D

ART UNIT	PAPER NUMBER
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2624

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/12/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/670,564

Applicant(s)

ASHTON, EDWARD

Examiner

Shefali D. Patel

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 January 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 November 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. The amendment was received on January 5, 2007.

Response to Arguments

2. Applicant's arguments filed under Remarks on pages 7-8 on January 5, 2007 have been fully considered but they are not persuasive. Applicant argue on page 7 stating:

"The applied reference uses an eigenvector classifier. It does not teach or suggest a maximum likelihood classifier which globally maximizes a discriminant function, as called for in the amended claims. Moreover, it would not even have been obvious to substitute a maximum likelihood classifier for the eigenvector classifier of the applied reference, as the applied reference in column 5 teaches the importance of using an eigenvector classifier in the method thereof. Thus, the applied reference, far from anticipating the present claimed invention, in fact teaches away from the present claimed invention."

The examiner respectfully disagrees.

There is nowhere in the reference by Young in column 5 ^{Shown} states that this invention will not work if maximum likelihood classifier is used. Eigenvector method is used to improve signal to noise ration, as one of the advantages. The examiner has used the reference by Bradshaw showing the discriminant function in the secondary reference. Also, the examiner has given the motivation to combine the two references as suggested by Bradshaw.

The applicant further argues stating:

"Nor does the reference teach or suggest using an exemplar input which comprises an identification of a seed or an exemplar region in the image (i.e., in the same image which is to be analyzed). Instead, the reference teaches the use of training data. By using an identification of a seed or an exemplar region in the same image, the present claimed invention offers an advantage in terms of not requiring training data."

The examiner respectfully disagrees.

Young does show the exemplar input comprising seed in the image at col. 6 line 54-65, col. 8 lines 1-5 and col. 8 lines 54-62 where the pattern is being identified for the cylindrical bones in the image.

Claim Objections

3. Claim 1 is objected to because of the following informalities: Claim 1 step c, d and e recites "exemplar input." Should this be "exemplar input"? There might be just a difference in spelling. Please check the specification to be consistent. Appropriate correction is required. Please note that claims 8, 23 and 25 recites "exemplar region." Is there a difference between "exemplar" and "exemplar"?
4. Claims 5, 6, 18, 22 recite the same feature.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-4, 6-14, 18-21 and 23-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Young et al (hereinafter, "Young") (US 6,625,303) in view of Bradshaw (US 2002/0122596).

With regard to **claim 1** Young discloses a method for identifying, delineating, and measuring structures in an image, the method comprising (a) receiving image data representing the image (col. 6 lines 52-66, col. 7 lines 10-20); (b) statistically identifying types of structures in the image by applying a maximum likelihood classifier to the image data (col. 7 lines 5-9, col. 8 lines 15-21); (c) forming a statistical description of a structure of interest in the image in accordance with the types of structures identified in step (b) and an exemplar input which comprises an identification of a seed or an exemplar region in the image (col. 8 lines 2-8, col. 10 lines 1-14, col. 12 lines 28-34, the exemplar input comprising an identification of a seed at col. 6 lines 58-62 where bone is identified from an image); (d) forming a morphological description of the structure of interest in accordance with the statistical description formed in step (c) and the exemplar input (col. 12 lines 43-48); and (e) forming a structural identification of the structure of interest in accordance with the morphological description formed in step (d) and the exemplar

input (col. 12 lines 48-57). Young does not expressly disclose the maximum likelihood classifier being a classifier, which globally maximizes a discriminant function. Bradshaw discloses this on page 5 paragraphs 76-80. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the teaching of Bradshaw with Young. The motivation for doing so is to separate classes, which are non-linearly separable, and hence allows a much wider range of problems to be solved. Therefore, it would have been obvious to combine Bradshaw with Young to obtain the invention as specified in claim 1.

With regard to **claim 2** Bradshaw discloses the maximum likelihood classifier comprising a discriminant function on page 5 paragraphs 76-80.

With regard to **claim 3** Bradshaw discloses selecting the discriminant function in accordance with an availability of a priori probabilities (page 5 paragraph 82).

With regard to **claim 4** Bradshaw discloses selecting the discriminant function in accordance with an expectation of whether the types of structures to be statistically identified will have different covariance matrices (page 5 paragraphs 83 and 84).

With regard to **claims 6-7** Young discloses the exemplar input derived from an input manually made by a user, comprising a mouse click (col. 7 lines 36-40).

With regard to **claims 8 and 9** Bradshaw discloses using region identification using the maximum likelihood classified (page 4 paragraph 62-63 and 72-74).

With regard to **claim 10** Young discloses (f) receiving a verification of an accuracy of structural identification formed in step (e) by displaying the image at 314 in Figure 9 or output it at printer, for example, at 318 as seen in Figure 9.

With regard to **claim 11** Young discloses repeating the step (c), (d), (e) and (f) at col. 11 lines 33-36.

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With regard to **claim 12** Young discloses data of a plurality of image at 132 and 130 in Figure 1(b).

With regard to **claim 13** Young discloses step (e) is being performed on an image-by-image basis for the plurality of images (col. 11 lines 33-36).

With regard to **claim 14** Young discloses forming the structural identification for one of the image (col. 8 lines 2-8, col. 10 lines 1-14, col. 12 lines 28-34); and using the structural identification formed for said one of the image to seed the structural identification in remaining ones of the image (the information from one of the image is stored (or sent) to the classified and used for future images, col. 12 lines 48-57).

Claim 18 recites identical features as claim 1 except claim 18 is a system claim. Thus, arguments similar to that presented above for claim 1 is equally applicable to claim 18. Please note, Young discloses a system processing the method of claim 1 as seen in Figures 9-10.

Claim 19 recites identical features as claim 2. Thus, arguments similar to that presented above for claim 2 is equally applicable to claim 19.

Claim 20 recites identical features as claim 3. Thus, arguments similar to that presented above for claim 3 is equally applicable to claim 20.

Claim 21 recites identical features as claim 4. Thus, arguments similar to that presented above for claim 4 is equally applicable to claim 21.

Claims 23-24 recites identical features as claims 6-7. Thus, arguments similar to that presented above for claims 6-7 is equally applicable to claims 23-24.

Claims 25 and 26 recites identical features as claims 8 and 9. Thus, arguments similar to that presented above for claims 8 and 9 is equally applicable to claims 25 and 26.

Claim 27 recites identical features as claim 10. Thus, arguments similar to that presented above for claim 10 is equally applicable to claim 27.

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Claim 28 recites identical features as claim 11. Thus, arguments similar to that presented above for claim 11 is equally applicable to claim 28.

Claim 29 recites identical features as claims 12 and 13. Thus, arguments similar to that presented above for claims 12 and 13 is equally applicable to claim 29.

Claim 30 recites identical features as claim 14. Thus, arguments similar to that presented above for claim 14 is equally applicable to claim 30.

7. Claims 5 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Young et al (hereinafter, "Young") (US 6,625,303) in view of Bradshaw (US 2002/0122596) as applied to claims 1-4, 6-14, 18-21 and 23-30 above, and further in view of Miller (US 2001/0036302 A1).

With regard to **claim 5** Young (in view of Bradshaw) discloses the method as disclosed above in claim 1 and the arguments are not repeated herein, but are incorporated by reference. Neither Young nor Bradshaw expressly disclose the exemplar input derived from a co-registered anatomical atlas. Miller discloses this on page 2 paragraph 26. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the teaching of Miller with Young and Bradshaw. The motivation for doing so is to have information in many forms representative of anatomical regions of interest for a particular application as suggested by Miller. Therefore, it would have been obvious to combine Miller with Young and Bradshaw to obtain the invention as specified in claim 5.

Claim 22 recites identical features as claim 5. Thus, arguments similar to that presented above for claim 5 is equally applicable to claim 22.

8. Claims 15-17 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Young et al (hereinafter, "Young") (US 6,625,303) in view of Bradshaw (US 2002/0122596) as applied to claims 1-4, 6-14, 18-21 and 23-30 above, and further in view of Williame et al (hereinafter, "Williame") (US

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7,027,650).

With regard to **claim 15** Young (modified by Bradshaw) discloses the method as disclosed above in claim 1 and the arguments are not repeated herein, but are incorporated by reference. Neither Young nor expressly disclose step (e) further comprising determining whether each of the remaining ones of the images comprises a bifurcation point of the structure of interest. Willame discloses this at col. 11 lines 37-39, lines 50-59 and col. 12 lines 16-55. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the teaching of Willame with Young and Bradshaw. The motivation for doing so is to obtain the direction and speed by analyzing the vector as suggested by Willame at col. 12 lines 35-50. Therefore, it would have been obvious to combine Willame with Young and Bradshaw to obtain the invention as specified in claim 15.

With regard to **claim 16** Young discloses the image a medical image and wherein the structure comprises tissues (col. 8 lines 22-25 and lines 29-36).

With regard to **claim 17** Young discloses the image an MRI image at col. 7 lines 14-21.

Claim 31 recites identical features as claim 15. Thus, arguments similar to that presented above for claim 15 is equally applicable to claim 31.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 6,249,594 – Autosegmentation/Autocontouring system and method – col. 7 lines 27-43, col. 8 lines 45-58 and col. 10 lines 24-55.

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing

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date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shefali D. Patel whose telephone number is 571-272-7396. The examiner can normally be reached on M-F 8:00am - 5:00pm (First Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella can be reached on (571) 272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Shefali D Patel
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Art Unit 2624

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